

SEQUENCE LISTING

<110> Petrini, John H.J.
Morgan, William Franklin
Maser, Richard Scott
Carney, James Patrick

<120> DNA Encoding A DNA Repair Protein

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<140> US 09/067,641
<141> 1998-04-27

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<170> FastSEQ for Windows Version 3.0

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| aaatcatgt gtgttaactg ctaactttc tgtaaccaac ctgagtcaaa cagatgaaat | 240 |
| ccctgtattt acattaaaag ataattctaa gtatggtacc tttgttaatg aggaaaaat | 300 |
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| gacagaagaa tgcactcacc ttgtcatggt atcagtaaaa gttaccatta aaacaatatg | 540 |
| tgcactcatt tgtggacgac caattgtaaa gccagaatat tttactgaat tcctgaaagc | 600 |
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| atctatttgg agtaaaaatg ttgatctgtc aggacggcag gaaagaaaaac aaatcttcaa | 720 |
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| ctttggaggt ggggaagcta ggttgataac agaagagaat gaagaagaac ataatttctt | 840 |

| | |
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| tgactgtcag aagaaatgga ttcagtcaat aatggatatg ctccaaaggc aaggcttag | 960 |
| acctattcct gaagcagaaa ttggattggc ggtgatttc atgactacaa agaattactg | 1020 |
| tgatcctcag ggccatccc gtacaggatt aaagacaaca actccaggac cagccttc | 1080 |
| acaaggcgtg tcagttatg aaaaactaat gccaagcgcc coagtgaaca ctacaacata | 1140 |
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| agatagggct tctcagcagc agcagaccaa ctccatcaga aactacttcc agccgtctac | 1440 |
| caaaaaaagg gaaaggatg aagaaaatca agaaatgtct tcatgcaaat cagcaagaat | 1500 |
| agaaaacgtct tgttctcttt tagaacaac acaacctgct acaccctcat tgtggaaaaa | 1560 |
| taaggagcag catctatctg agaatgagcc tgtggacaca aactcagaca ataacttatt | 1620 |
| tacagataca gatttaaaat ctattgtgaa aaattctgcc agtaaatctc atgctgcaga | 1680 |
| aaagctaaga tcaaataaaa aaagggaaat ggtatgtgt gccatagaag atgaagtatt | 1740 |
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| ggaggaagat gtcaatgtt gaaaaaggcc aaggatggat atagaaacaa atgacacttt | 1860 |
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| tggaggatca gatctaatacg ctcatcatgc tcgaaaagat acagaactag aagagtggct | 2220 |
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| attctaaatr tacgttaaggt aaaggactaa agtcaccctt ccaccattgt cctagctact | 2640 |
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| ttcttttcca ttatgctgtt gtcttaccta aactctgggt atccaaacaa aatggcttca | 2820 |
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| tattcatgtt cctgtgatcc agcaagaagg gagttccagt caagagtac tacactgat | 3180 |

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| tagttgttta | gagaatgaga | aatggAACAG | tgaggaATGG | aggccATATT | tccatGACTT | 3240 |
| cccttgtaaa | cagaAGCAAC | agaAGGGACA | agaggCTGGC | ctctACATCA | ctctCACCTT | 3300 |
| ccaaatcttgc | tggaAGTGCA | tctacttgCC | agaACCAAAT | taacttACTT | ccaAGTTCTG | 3360 |
| gctgcttgca | ggtggAACTC | cagctgcaag | ggagttAGGG | aaatGAAGGT | cttttttAA | 3420 |
| aagcttctca | gccttcCTAG | ggaACAGAAA | ttgggtGAGC | caatCTGCAA | tttctACTAC | 3480 |
| aggcattgag | accagttagA | ttattgaaAT | attataGAGA | gttatGAACA | cttaaATTAT | 3540 |
| gatagtggta | tgacatTTGGA | tagAACATGG | gataCTTAG | aagtGAATT | gacAGGGCAT | 3600 |
| attagttgat | gaaatGGAGT | catttgAGTC | tyttaATAGC | catgtatCAT | aattACCAAG | 3660 |
| tgaagctgg | ggaACATATG | gtctccATT | tacAGTTAG | gaatATAATG | gacAGATTAA | 3720 |
| tattgttytC | tgtcatGCC | acaatCCCTT | tctaAGGAAG | actGCCCTAC | tatAGCAGTT | 3780 |
| tttatTTTG | tcaatttATG | aatataATGA | atgaggAGTT | ctggTACCTC | ctgtCTTAC | 3840 |
| aaatatttGGG | tgttgtCCAG | tattttCCC | tttttaACCM | ttcccaATTc | gggtGTGTA | 3900 |
| gtggatgttt | ccatttGGGT | tttaatttGT | atatCCCTGA | tagCTATAAT | tgggtCATAG | 3960 |
| aaatttCTTA | tacattCTAG | atgcaAGTCT | cttgycGGAT | atacgtATTG | agatATTACA | 4020 |
| cctagtCTGT | ggcttGACTG | tttCTTTAT | gtctttGT | gaatAGAAGT | tttaAAATTt | 4080 |
| gacaaggTCa | aatttATTTT | tttCTTTGT | ttgatATTt | ttctctccAA | tttaACCCCA | 4140 |
| agatttCAGA | tattctGCTC | tattatATAA | actttatATT | tttatATTG | tGATCTACCT | 4200 |
| tgaattgata | tgtatGTTGT | gaattatGGA | tcaggGTTCT | tttttcccc | catacaAGTA | 4260 |
| tccagtcatt | gtaacACTGT | ttattgAAAG | aattatCCTT | tcctcattAA | attacCTTGC | 4320 |
| caatttagtaa | aaaatcaatt | aaccatRmar | mmmmrrrggat | ccactagttc | tagAGCGGCC | 4380 |
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<400> 2

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| 1 | | | | | | | | | | | | | | | | 15 |
| Arg | Leu | Leu | Thr | Gly | Val | Glu | Tyr | Val | Val | Gly | Arg | Lys | Asn | Cys | Ala | |
| | | | | | | | | | | | | | | | | 20 |
| Ile | Leu | Ile | Glu | Asn | Asp | Gln | Ser | Ile | Ser | Arg | Asn | His | Ala | Val | Leu | |
| | | | | | | | | | | | | | | | | 35 |
| Thr | Ala | Asn | Phe | Ser | Val | Thr | Asn | Leu | Ser | Gln | Thr | Asp | Glu | Ile | Pro | |
| | | | | | | | | | | | | | | | | 50 |
| Val | Leu | Thr | Leu | Lys | Asp | Asn | Ser | Lys | Tyr | Gly | Thr | Phe | Val | Asn | Glu | |
| | | | | | | | | | | | | | | | | 65 |
| Glu | Lys | Met | Gln | Asn | Gly | Phe | Ser | Arg | Thr | Leu | Lys | Ser | Gly | Asp | Gly | |
| | | | | | | | | | | | | | | | | 70 |
| | | | | | | | | | | | | | | | | 75 |
| | | | | | | | | | | | | | | | | 80 |

| 85 | 90 | 95 |
|---|-----|-----|
| Ile Thr Phe Gly Val Phe Gly Ser Lys Phe Arg Ile Glu Tyr Glu Pro | | |
| 100 | 105 | 110 |
| Leu Val Ala Cys Ser Ser Cys Leu Asp Val Ser Gly Lys Thr Ala Leu | | |
| 115 | 120 | 125 |
| Asn Gln Ala Ile Leu Gln Leu Gly Gly Phe Thr Val Asn Asn Trp Thr | | |
| 130 | 135 | 140 |
| Glu Glu Cys Thr His Leu Val Met Val Ser Val Lys Val Thr Ile Lys | | |
| 145 | 150 | 155 |
| 160 | | |
| Thr Ile Cys Ala Leu Ile Cys Gly Arg Pro Ile Val Lys Pro Glu Tyr | | |
| 165 | 170 | 175 |
| Phe Thr Glu Phe Leu Lys Ala Val Gln Ser Lys Lys Gln Pro Pro Gln | | |
| 180 | 185 | 190 |
| Ile Glu Ser Phe Tyr Pro Pro Leu Asp Glu Pro Ser Ile Gly Ser Lys | | |
| 195 | 200 | 205 |
| Asn Val Asp Leu Ser Gly Arg Gln Glu Arg Lys Gln Ile Phe Lys Gly | | |
| 210 | 215 | 220 |
| Lys Thr Phe Ile Phe Leu Asn Ala Lys Gln His Lys Lys Leu Ser Ser | | |
| 225 | 230 | 235 |
| 240 | | |
| Ala Val Val Phe Gly Gly Glu Ala Arg Leu Ile Thr Glu Glu Asn | | |
| 245 | 250 | 255 |
| Glu Glu Glu His Asn Phe Phe Leu Ala Pro Gly Thr Cys Val Val Asp | | |
| 260 | 265 | 270 |
| Thr Gly Ile Thr Asn Ser Gln Thr Leu Ile Pro Asp Cys Gln Lys Lys | | |
| 275 | 280 | 285 |
| Trp Ile Gln Ser Ile Met Asp Met Leu Gln Arg Gln Gly Leu Arg Pro | | |
| 290 | 295 | 300 |
| Ile Pro Glu Ala Glu Ile Gly Leu Ala Val Ile Phe Met Thr Thr Lys | | |
| 305 | 310 | 315 |
| 320 | | |
| Asn Tyr Cys Asp Pro Gln Gly His Pro Ser Thr Gly Leu Lys Thr Thr | | |
| 325 | 330 | 335 |
| Thr Pro Gly Pro Ser Leu Ser Gln Gly Val Ser Val Asp Glu Lys Leu | | |
| 340 | 345 | 350 |
| Met Pro Ser Ala Pro Val Asn Thr Thr Tyr Val Ala Asp Thr Glu | | |
| 355 | 360 | 365 |
| Ser Glu Gln Ala Asp Thr Trp Asp Leu Ser Glu Arg Pro Lys Glu Ile | | |
| 370 | 375 | 380 |
| Lys Val Ser Lys Met Glu Gln Lys Phe Arg Met Leu Ser Gln Asp Ala | | |
| 385 | 390 | 395 |
| | | 400 |

Pro Thr Val Lys Glu Ser Cys Lys Thr Ser Ser Asn Asn Asn Ser Met
405 410 415
Val Ser Asn Thr Leu Ala Lys Met Arg Ile Pro Asn Tyr Gln Leu Ser
420 425 430
Pro Thr Lys Leu Pro Ser Ile Asn Lys Ser Lys Asp Arg Ala Ser Gln
435 440 445
Gln Gln Gln Thr Asn Ser Ile Arg Asn Tyr Phe Gln Pro Ser Thr Lys
450 455 460
Lys Arg Glu Arg Asp Glu Glu Asn Gln Glu Met Ser Ser Cys Lys Ser
465 470 475 480
Ala Arg Ile Glu Thr Ser Cys Ser Leu Leu Glu Gln Thr Gln Pro Ala
485 490 495
Thr Pro Ser Leu Trp Lys Asn Lys Glu Gln His Leu Ser Glu Asn Glu
500 505 510
Pro Val Asp Thr Asn Ser Asp Asn Asn Leu Phe Thr Asp Thr Asp Leu
515 520 525
Lys Ser Ile Val Lys Asn Ser Ala Ser Lys Ser His Ala Ala Glu Lys
530 535 540
Leu Arg Ser Asn Lys Lys Arg Glu Met Asp Asp Val Ala Ile Glu Asp
545 550 555 560
Glu Val Leu Glu Gln Leu Phe Lys Asp Thr Lys Pro Glu Leu Glu Ile
565 570 575
Asp Val Lys Val Gln Lys Gln Glu Glu Asp Val Asn Val Arg Lys Arg
580 585 590
Pro Arg Met Asp Ile Glu Thr Asn Asp Thr Phe Ser Asp Glu Ala Val
595 600 605
Pro Glu Ser Ser Lys Ile Ser Gln Glu Asn Glu Ile Gly Lys Lys Arg
610 615 620
Glu Leu Lys Glu Asp Ser Leu Trp Ser Ala Lys Glu Ile Ser Asn Asn
625 630 635 640
Asp Lys Leu Gln Asp Asp Ser Glu Met Leu Pro Lys Lys Leu Leu Leu
645 650 655
Thr Glu Phe Arg Ser Leu Val Ile Lys Asn Ser Thr Ser Arg Asn Pro
660 665 670
Ser Gly Ile Asn Asp Asp Tyr Gly Gln Leu Lys Asn Phe Lys Lys Phe
675 680 685
Lys Lys Val Thr Tyr Pro Gly Ala Gly Lys Leu Pro His Ile Ile Gly
690 695 700
Gly Ser Asp Leu Ile Ala His His Ala Arg Lys Asn Thr Glu Leu Glu

705 710 715 720
Glu Trp Leu Arg Gln Glu Met Glu Val Gln Asn Gln His Ala Lys Glu
 725 730 735
Glu Ser Leu Ala Asp Asp Leu Phe Arg Tyr Asn Pro Tyr Leu Lys Arg
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Arg Arg

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<212> PRT
<213> Homo sapiens

<220>
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<400> 3

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Ser Ile Ser Arg Asn His Ala Val Leu Thr Ala Asn Phe Ser Val Thr
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Asn Leu Ser Gln Thr Asp Glu Ile Pro Val Leu Thr Leu Lys Asn Xaa
35 40 45
Lys Tyr Gly Thr Phe Val Asn Glu Lys Met Gln Asn Gly Phe Ser
50 55 60
Arg Thr Leu Lys Ser Val Asp Gly Ile Thr Phe Gly Val Phe Gly Ser
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Lys Phe Arg Ile Glu Tyr Glu
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<212> PRT
<213> Homo sapiens

<400> 4

Tyr Ser Ile Gly Arg Ser Ser Lys Asn Pro Leu Ile Ile Lys Asn Asp

1 5 10 15
Lys Ser Ile Ser Arg Gln His Ile Thr Phe Lys Trp Glu Ile Asn Asn
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Ser Ser Asp Leu Lys His Ser Ser Leu Cys Leu Val Asn Lys Gly Lys
35 40 45
Leu Thr Ser Leu Asn Lys Lys Phe Met Lys Val Gly Glu Thr Phe Thr
50 55 60
Ile Asn Ala Ser Cys Val Leu Lys Ser Thr Ile Glu Leu Gly Thr Thr
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Pro Ile Arg Ile Glu Phe Glu
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Gly Asn Asp Thr Phe Val Thr Leu Asp Glu Ile Leu Arg Leu Ala Gln
35 40 45

Glu Asn Glu Val Asp Phe Ile Leu Leu Gly Gly Asp Leu Phe His Glu
50 55 60

Asn Lys Pro Ser Arg Lys Thr Leu His Thr Cys Leu Glu Leu Leu Arg
65 70 75 80

Lys Tyr Cys Met Gly Asp Arg Pro Val Gln Phe Glu Ile Leu Ser Asp
85 90 95

Gln Ser Val Asn Phe Gly Phe Ser Lys Phe Pro Trp Val Asn Tyr Gln
100 105 110
Asp Gly Asn Leu Asn Ile Ser Ile Pro Val Phe Ser Ile His Gly Asn
115 120 125
His Asp Asp Pro Thr Gly Ala Asp Ala Leu Cys Ala Leu Asp Ile Leu
130 135 140
Ser Cys Ala Gly Phe Val Asn His Phe Gly Arg Ser Met Ser Val Glu
145 150 155 160
Lys Ile Asp Ile Ser Pro Val Leu Leu Gln Lys Gly Ser Thr Lys Ile
165 170 175
Ala Leu Tyr Gly Leu Gly Ser Ile Pro Asp Glu Arg Leu Tyr Arg Met
180 185 190
Phe Val Asn Lys Lys Val Thr Met Leu Arg Pro Lys Glu Asp Glu Asn
195 200 205
Ser Trp Phe Asn Leu Phe Val Ile His Gln Asn Arg Ser Lys His Gly
210 215 220
Ser Thr Asn Phe Ile Pro Glu Gln Phe Leu Asp Asp Phe Ile Asp Leu
225 230 235 240
Val Ile Trp Gly His Glu His Glu Cys Lys Ile Ala Pro Thr Lys Asn
245 250 255
Glu Gln Gln Leu Phe Tyr Ile Ser Gln Pro Gly Ser Ser Val Val Thr
260 265 270
Ser Leu Ser Pro Gly Glu Ala Val Lys Lys His Val Gly Leu Leu Arg
275 280 285
Ile Lys Gly Arg Lys Met Asn Met His Lys Ile Pro Leu His Thr Val
290 295 300
Arg Gln Phe Phe Met Glu Asp Ile Val Leu Ala Asn His Pro Asp Ile
305 310 315 320
Phe Asn Pro Asp Asn Pro Lys Val Thr Gln Ala Ile Gln Ser Phe Cys
325 330 335
Leu Glu Lys Ile Glu Glu Met Leu Glu Asn Ala Glu Arg Glu Arg Leu
340 345 350
Gly Asn Ser His Gln Pro Glu Lys Pro Leu Val Arg Leu Arg Val Asp
355 360 365
Tyr Ser Gly Gly Phe Glu Pro Phe Ser Val Leu Arg Phe Ser Gln Lys
370 375 380
Phe Val Asp Arg Val Ala Asn Pro Lys Asp Ile Ile His Phe Phe Arg
385 390 395 400
His Arg Glu Gln Lys Glu Lys Thr Gly Glu Glu Ile Asn Phe Gly Lys

| | | |
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| 405 | 410 | 415 |
| Leu Ile Thr Lys Pro Ser Glu Gly Thr Thr Leu Arg Val Glu Asp Leu | | |
| 420 | 425 | 430 |
| Val Lys Gln Tyr Phe Gln Thr Ala Glu Lys Asn Val Gln Leu Ser Leu | | |
| 435 | 440 | 445 |
| Leu Thr Glu Arg Gly Met Gly Glu Ala Val Gln Glu Phe Val Asp Lys | | |
| 450 | 455 | 460 |
| Glu Glu Lys Asp Ala Ile Glu Glu Leu Val Lys Tyr Gln Leu Glu Lys | | |
| 465 | 470 | 475 |
| 480 | | |
| Thr Gln Arg Phe Leu Lys Glu Arg His Ile Asp Ala Leu Glu Asp Lys | | |
| 485 | 490 | 495 |
| Ile Asp Glu Glu Val Arg Arg Phe Arg Glu Thr Arg Gln Lys Asn Thr | | |
| 500 | 505 | 510 |
| Asn Glu Glu Asp Asp Glu Val Arg Glu Ala Met Thr Arg Ala Arg Ala | | |
| 515 | 520 | 525 |
| Leu Arg Ser Gln Ser Glu Glu Ser Ala Ser Ala Phe Ser Ala Asp Asp | | |
| 530 | 535 | 540 |
| Leu Met Ser Ile Asp Leu Ala Glu Gln Met Ala Asn Asp Ser Asp Asp | | |
| 545 | 550 | 555 |
| 560 | | |
| Ser Ile Ser Ala Ala Thr Asn Lys Gly Arg Gly Arg Gly Arg Gly Arg | | |
| 565 | 570 | 575 |
| Arg Gly Arg Gly Gln Asn Ser Ala Ser Arg Gly Gly Ser Gln Arg | | |
| 580 | 585 | 590 |
| Gly Arg Ala Phe Lys Ser Thr Arg Gln Gln Pro Ser Arg Asn Val Thr | | |
| 595 | 600 | 605 |
| Thr Lys Asn Tyr Ser Glu Val Ile Glu Val Asp Glu Ser Asp Val Glu | | |
| 610 | 615 | 620 |
| Glu Asp Ile Phe Pro Thr Thr Ser Lys Thr Asp Gln Arg Trp Ser Ser | | |
| 625 | 630 | 635 |
| 640 | | |
| Thr Ser Ser Ser Lys Ile Met Ser Gln Ser Gln Val Ser Lys Gly Val | | |
| 645 | 650 | 655 |
| Asp Phe Glu Ser Ser Glu Asp Asp Asp Asp Pro Phe Met Asn Thr | | |
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| Ser Ser Leu Arg Arg Asn Arg Arg | | |
| 675 | 680 | |

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<212> DNA

<213> Homo sapiens

<400> 7

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| ggggttcttgc | gagaagaacc | tggcccaga | ggagcttgcac | tgaccataaa | aatgagtact | 180 |
| gcagatgcac | ttgatgtga | aaacacattt | aaaatattag | ttgcaacaga | tattcatctt | 240 |
| ggatttatgg | agaaagatgc | agccagagga | aatgatacgt | ttgtaacact | cgatgaaatt | 300 |
| ttaagacttg | cccaggaaaa | tgaagtggat | tttattttgt | tagtggtga | tcttttcat | 360 |
| gaaaataagc | cctcaaggaa | aacattacat | acctgcctcg | agttattaag | aaaatattgt | 420 |
| atgggtgatc | ggcctgtcca | gttggaaatt | ctcagtgatc | agtcagtcaa | ctttggttt | 480 |
| agtaagtttc | catgggtgaa | ctatcaagat | ggcaacctca | acatttcaat | tccagtggtt | 540 |
| agtattcatg | gcaatcatga | cgatcccaca | ggggcagatg | cactttgtgc | cttggacatt | 600 |
| ttaagttgtg | ctggatttgt | aaatcacttt | ggacgttcaa | tgtctgtgga | gaagatagac | 660 |
| attagtcgg | ttttgcttca | aaaaggaagc | acaaagattg | cgctatatgg | tttaggatcc | 720 |
| attccagatg | aaaggctcta | togaatgttt | gtcaataaaa | aagtaacaat | gttgagacca | 780 |
| aaggaagatg | agaactcttgc | gtttaactta | tttgtgattc | atcagaacag | gagtaaacat | 840 |
| ggaagtacta | acttcattcc | agaacaattt | ttggatgact | tcattgatct | tgttatctgg | 900 |
| ggccatgaac | atgagtgtaa | aatagctcca | acaaaaatg | aacaacagct | gttttatatc | 960 |
| tcacaacctg | gaagctcagt | ggttacttct | ctttccccag | gagaagctgt | aaagaaacat | 1020 |
| gttggtttgc | tgcgtattaa | agggaggaag | atgaatatgc | ataaaaattcc | tcttcacaca | 1080 |
| gtgcggcagt | tttcatgga | ggatattgtt | ctagctaatc | atccagacat | ttttaaccca | 1140 |
| gataatccta | aagtaaccca | agccatacaa | agcttctgtt | tggagaagat | tgaagaaatg | 1200 |
| cttggaaatg | ctgaacggga | acgtctgggt | aattctcacc | agccagagaa | gcctcttgta | 1260 |
| cgactgcgag | tggactatacg | tggaggtttt | gaaccttca | gtgttcttcg | ctttagccag | 1320 |
| aaatttgtgg | atcgggtagc | taatccaaaa | gacattatcc | atttttcag | gcata gagaa | 1380 |
| caaaaaggaaa | aaacaggaga | agagatcaac | tttggggaaac | ttatcacaaa | gccttcagaa | 1440 |
| ggaacaactt | taagggtaga | agatcttgc | aaacagtact | ttcaaaccgc | agagaagaat | 1500 |
| gtgcagctct | cactgctaac | agaaaagaggg | atgggtgaag | cagtacaaga | atttgtggac | 1560 |
| aaggaggaga | aagatgccat | tgaggaatta | gtgaaatacc | agttggaaaa | aacacagcga | 1620 |
| tttcttaaag | aacgtcatat | tgatgccctc | gaagacaaaa | tcgatgagga | ggtacgtcgt | 1680 |
| ttcagagaaa | ccagacaaaa | aaatactaatt | gaagaagatg | atgaagtccg | tgaggctatg | 1740 |
| accaggggcca | gagcactcag | atctcagtca | gaggagtctg | cttctgcctt | tagtgctgt | 1800 |
| gaccttatga | gtatagattt | agcagaacacag | atggctaattg | actctgatga | tagcatctca | 1860 |
| gcagcaacca | acaaaggaag | aggccgagga | agaggtcgaa | gaggtggaag | agggcagaat | 1920 |
| tcagcatcga | gaggagggtc | tcaaagagga | agagccttta | aatctacaag | acagcagcct | 1980 |
| tcccgaaatg | tcactactaa | gaatttattca | gaggtgattt | aggttagatga | atcagatgtg | 2040 |
| gaagaagaca | tttttcctac | | | | | 2060 |

<210> 8
<211> 680
<212> PRT
<213> Homo sapiens

<400> 8

Met Ser Thr Ala Asp Ala Leu Asp Asp Glu Asn Thr Phe Lys Ile Leu
1 5 10 15

Val Ala Thr Asp Ile His Leu Gly Phe Met Glu Lys Asp Ala Ala Arg
20 25 30

Gly Asn Asp Thr Phe Val Thr Leu Asp Glu Ile Leu Arg Leu Ala Gln
35 40 45

Glu Asn Glu Val Asp Phe Ile Leu Leu Gly Gly Asp Leu Phe His Glu
50 55 60

Asn Lys Pro Ser Arg Lys Thr Leu His Thr Cys Leu Glu Leu Leu Arg
65 70 75 80

Lys Tyr Cys Met Gly Asp Arg Pro Val Gln Phe Glu Ile Leu Ser Asp
85 90 95

Gln Ser Val Asn Phe Gly Phe Ser Lys Phe Pro Trp Val Asn Tyr Gln
100 105 110

Asp Gly Asn Leu Asn Ile Ser Ile Pro Val Phe Ser Ile His Gly Asn
115 120 125

His Asp Asp Pro Thr Gly Ala Asp Ala Leu Cys Ala Leu Asp Ile Leu
130 135 140

Ser Cys Ala Gly Phe Val Asn His Phe Gly Arg Ser Met Ser Val Glu
145 150 155 160

Lys Ile Asp Ile Ser Pro Val Leu Leu Gln Lys Gly Ser Thr Lys Ile
165 170 175

Ala Leu Tyr Gly Leu Gly Ser Ile Pro Asp Glu Arg Leu Tyr Arg Met
180 185 190

Phe Val Asn Lys Lys Val Thr Met Leu Arg Pro Lys Glu Asp Glu Asn
195 200 205

Ser Trp Phe Asn Leu Phe Val Ile His Gln Asn Arg Ser Lys His Gly
210 215 220

Ser Thr Asn Phe Ile Pro Glu Gln Phe Leu Asp Asp Phe Ile Asp Leu
225 230 235 240

Val Ile Trp Gly His Glu His Glu Cys Lys Ile Ala Pro Thr Lys Asn
245 250 255

Glu Gln Gln Leu Phe Tyr Ile Ser Gln Pro Gly Ser Ser Val Val Thr

| 260 | 265 | 270 |
|---|-----|-----|
| Ser Leu Ser Pro Gly Glu Ala Val Lys Lys His Val Gly Leu Leu Arg | | |
| 275 | 280 | 285 |
| Ile Lys Gly Arg Lys Met Asn Met His Lys Ile Pro Leu His Thr Val | | |
| 290 | 295 | 300 |
| Arg Gln Phe Phe Met Glu Asp Ile Val Leu Ala Asn His Pro Asp Ile | | |
| 305 | 310 | 315 |
| Phe Asn Pro Asp Asn Pro Lys Val Thr Gln Ala Ile Gln Ser Phe Cys | | |
| 325 | 330 | 335 |
| Leu Glu Lys Ile Glu Glu Met Leu Glu Asn Ala Glu Arg Glu Arg Leu | | |
| 340 | 345 | 350 |
| Gly Asn Ser His Gln Pro Glu Lys Pro Leu Val Arg Leu Arg Val Asp | | |
| 355 | 360 | 365 |
| Tyr Ser Gly Gly Phe Glu Pro Phe Ser Val Leu Arg Phe Ser Gln Lys | | |
| 370 | 375 | 380 |
| Phe Val Asp Arg Val Ala Asn Pro Lys Asp Ile Ile His Phe Phe Arg | | |
| 385 | 390 | 395 |
| His Arg Glu Gln Lys Glu Lys Thr Gly Glu Glu Ile Asn Phe Gly Lys | | |
| 405 | 410 | 415 |
| Leu Ile Thr Lys Pro Ser Glu Gly Thr Thr Leu Arg Val Glu Asp Leu | | |
| 420 | 425 | 430 |
| Val Lys Gln Tyr Phe Gln Thr Ala Glu Lys Asn Val Gln Leu Ser Leu | | |
| 435 | 440 | 445 |
| Leu Thr Glu Arg Gly Met Gly Glu Ala Val Gln Glu Phe Val Asp Lys | | |
| 450 | 455 | 460 |
| Glu Glu Lys Asp Ala Ile Glu Glu Leu Val Lys Tyr Gln Leu Glu Lys | | |
| 465 | 470 | 475 |
| Thr Gln Arg Phe Leu Lys Glu Arg His Ile Asp Ala Leu Glu Asp Lys | | |
| 485 | 490 | 495 |
| Ile Asp Glu Glu Val Arg Arg Phe Arg Glu Thr Arg Gln Lys Asn Thr | | |
| 500 | 505 | 510 |
| Asn Glu Glu Asp Asp Glu Val Arg Glu Ala Met Thr Arg Ala Arg Ala | | |
| 515 | 520 | 525 |
| Leu Arg Ser Gln Ser Glu Glu Ser Ala Ser Ala Phe Ser Ala Asp Asp | | |
| 530 | 535 | 540 |
| Leu Met Ser Ile Asp Leu Ala Glu Gln Met Ala Asn Asp Ser Asp Asp | | |
| 545 | 550 | 555 |
| Ser Ile Ser Ala Ala Thr Asn Lys Gly Arg Gly Arg Gly Arg Gly Arg | | |
| 565 | 570 | 575 |

Arg Gly Gly Arg Gly Gln Asn Ser Ala Ser Arg Gly Gly Ser Gln Arg
580 585 590
Gly Arg Ala Phe Lys Ser Thr Arg Gln Gln Pro Ser Arg Asn Val Thr
595 600 605
Thr Lys Asn Tyr Ser Glu Val Ile Glu Val Asp Glu Ser Asp Val Glu
610 615 620
Glu Asp Ile Phe Pro Thr Thr Ser Lys Thr Asp Gln Arg Trp Ser Ser
625 630 635 640
Thr Ser Ser Ser Lys Ile Met Ser Gln Ser Gln Val Ser Lys Gly Val
645 650 655
Asp Phe Glu Ser Ser Glu Asp Asp Asp Asp Pro Phe Met Asn Thr
660 665 670
Ser Ser Leu Arg Arg Asn Arg Arg
675 680

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<211> 20
<212> PRT
<213> Homo sapiens

<400> 9

Gln Pro Pro Gln Ile Glu Ser Phe Tyr Pro Pro Leu Asp Glu Pro Ser
1 5 10 15
Ile Gly Ser Lys
20

<210> 10
<211> 13
<212> PRT
<213> Homo sapiens

<400> 10

Leu Ser Ser Ala Val Val Phe Gly Gly Glu Ala Arg
1 5 10

<210> 11
<211> 11
<212> PRT
<213> Homo sapiens

<400> 11
Trp Ile Gln Ser Ile Met Asp Met Leu Gln Arg
1 5 10

<210> 12
<211> 21
<212> PRT
<213> Homo sapiens

<400> 12
Gln Gly Leu Arg Pro Ile Pro Glu Ala Glu Ile Gly Leu Ala Val Ile
1 5 10 15
Phe Met Thr Thr Lys
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<210> 13
<211> 17
<212> PRT
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<400> 13
Thr Thr Thr Pro Gly Pro Ser Leu Ser Gln Gly Val Ser Val Asp Glu
1 5 10 15
Lys

<210> 14
<211> 11
<212> PRT
<213> Homo sapiens

<400> 14
Met Leu Ser Gln Asp Ala Pro Thr Val Lys Glu
1 5 10

<210> 15
<211> 15
<212> PRT
<213> Homo sapiens

<400> 15

Thr Ser Ser Asn Asn Asn Ser Met Val Ser Asn Thr Leu Ala Lys
1 5 10 15

<210> 16

<211> 16

<212> PRT

<213> Homo sapiens

<400> 16

Ile Pro Asn Tyr Gln Leu Ser Pro Thr Lys Leu Pro Ser Ile Asn Lys
1 5 10 15

<210> 17

<211> 9

<212> PRT

<213> Homo sapiens

<400> 17

Asn Tyr Phe Gln Pro Ser Thr Lys Lys
1 5

<210> 18

<211> 27

<212> PRT

<213> Homo sapiens

<400> 18

Asn Lys Glu Gln His Leu Ser Glu Asn Glu Pro Val Asp Thr Asn Ser
1 5 10 15
Asp Asn Asn Leu Phe Thr Asp Thr Asp Leu Lys
20 25

<210> 19

<211> 17

<212> PRT

<213> Homo sapiens

<400> 19

Glu Met Asp Asp Val Ala Ile Glu Asp Glu Val Leu Glu Gln Leu Phe
1 5 10 15
Lys

<210> 20
<211> 19
<212> PRT
<213> Homo sapiens

<400> 20
Met Asp Ile Glu Thr Asn Asp Thr Phe Ser Asp Glu Ala Val Pro Glu
1 5 10 15
Ser Ser Lys

<210> 21
<211> 9
<212> PRT
<213> Homo sapiens

<400> 21
Glu Leu Lys Glu Asp Ser Trp Ala Lys
1 5

<210> 22
<211> 8
<212> PRT
<213> Homo sapiens

<400> 22
Lys Leu Leu Leu Thr Glu Phe Arg
1 5

<210> 23
<211> 13
<212> PRT
<213> Homo sapiens

<400> 23

Asn Pro Ser Gly Ile Asn Asp Asp Tyr Gly Gln Leu Lys

1

5

10

<210> 24

<211> 10

<212> PRT

<213> Homo sapiens

<400> 24

Glu Glu Ser Leu Ala Asp Asp Leu Phe Arg

1

5

10